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EXAMINER	
KUMAR, VINOD	
ART UNIT	PAPER NUMBER
1638	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,042	SHAW ET AL.	
	Examiner	Art Unit	
	Vinod Kumar	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-17,20 and 22-33* is/are pending in the application.

4a) Of the above claim(s) *16 and 20* is/are withdrawn from consideration.

5)☒ Claim(s) *22-25* is/are allowed.

6)☒ Claim(s) *6-15 and 26-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Claims 6-17, 20, and 22-33 are pending. Claims 22-25 are allowed. Claims 6-15, and 26-33 are examined in the instant Office action. All previous objections and rejections not set forth below have been withdrawn. This action is made FINAL.

Claim Objections

2. In claim 6, line 3, replace "identical" after "70%" and before "to" with --sequence identity--.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

3. Claims 6-15, and 26-33 remain rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated nucleic acid comprising a sequence that encodes the polypeptide of SEQ ID NO: 9, does not reasonably provide enablement for (a) a nucleic acid comprising a nucleotide sequence that encodes for a polypeptide which has less than 100% sequence identity to SEQ ID NO: 9, and (b) a nucleic acid comprising a nucleotide sequence that hybridizes to a probe containing the sequence of SEQ ID NO: 20, for the reasons of record stated in Office actions mailed on February 13, 2006 and July 28, 2006. Applicants traverse the rejection in the paper filed on December 4, 2006.

Applicants argue that one of ordinary skill in the art would not apply random amino acid replacement for making the polypeptide recited in claim which has at least 70% or 95% sequence identity to SEQ ID NO: 9 and retains its activity. Applicants further argue that one skilled in the art would know to avoid those conserved domains in the AtTLP family, i.e., tubby domain, F-box, TUB1 and TUB2 motifs (response, page 10 through the end of 2nd paragraph of page 11).

Applicant's arguments were fully considered but were not found persuasive. Examiner maintains that neither the state of prior art nor the specification provide guidance on which region(s) of SEQ ID NO: 9 is able to tolerate deletions, additions or substitutions of one or more amino acid without abrogating its activity of increasing the sensitivity of a plant to an environmental factor. Furthermore as stated in the previous Office actions, it is well established in the art that mutations outside the conserved domains can also lead to protein inactivation. Mutations outside the conserved domains can result in improper protein folding resulting in functional inactivation and/or proteolytic degradation. The nucleic acid sequences encoding a protein which has less than 100% sequence identity to SEQ ID NO: 9 would encompass sequences that do not have activity to increase sensitivity of a plant to environmental stresses as discussed in previous Office actions. In this regard, it is important to note the teachings of Guo et al. which clearly highlights a probability factor of 34% that a random amino acid replacement in a given protein will lead to its functional inactivation.

Applicants are reminded that the issue is *not* whether experimentation is required at the time claimed invention was made to determine how to make nucleic acid

sequences encoding a polypeptide which has at least 70% or 95% amino acid sequence identity to SEQ ID NO: 9. The issue is whether the experimentation required is undue, based upon the various factors previously discussed.

Applicants argue that Office has overlooked the limitation factor "encodes a polypeptide that has activity of increasing the sensitivity of a plant to an environmental factor", recited in claim 7. Applicants further argue that claim 7 covers nucleic acids that hybridize to SEQ ID NO: 20 and retain the recited function (response, page 11, lines 25-27).

Applicant's arguments were fully considered but were not found persuasive. Office maintains that claim 7 encompasses any nucleic acid comprising a nucleotide sequence that can hybridize to SEQ ID NO: 20 because the high stringency conditions as defined in last paragraph bridging pages 10 and 11 of specification would encompass hybridization of nucleic acid sequences unrelated to SEQ ID NO: 20. This implies that unrelated sequences either encoding no polypeptide or encoding a polypeptide which lacks the activity of increasing the sensitivity of a plant to an environmental factor would also hybridize to instant SEQ ID NO: 20. In response to Applicant's arguments, it may be emphasized that it is well established in the art of nucleic acid hybridization that hybridization in 0.1-1.0X SSC, 50% formamide and 50 °C for 24 hours, followed by 2 washes in 0.1% SDS, 0.1X SSC at 65 °C for 25-30 minutes each, are considered to be highly stringent condition that would not allow hybridization of unrelated nucleic acid sequences to the target sequence. The specification does not provide guidance on a *method of using* said unrelated nucleic acid sequences to

increase sensitivity of a plant to an environmental factor. Again, it may be emphasized that the issue is *not* whether experimentation is required at the time claimed invention was made to determine how to determine which nucleic acid sequences hybridize to SEQ ID NO: 9 under the conditions recited in the claim, and further test them for their functional activity. The issue is whether the experimentation required is undue, based upon the various factors discussed in previous Office actions and further outlined as above.

Accordingly, the rejection is maintained.

4. Claims 6-15 and 26-33 remain rejected under 35 U.S.C. 112, first paragraph rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention for the reasons of record stated in Office action mailed on February 13, 2006 and July 28, 2006. Applicants traverse the rejection in the paper filed December 4, 2006.

Applicants argue that the specification discloses the full amino acid sequence of AtTLP9 (SEQ ID NO: 9) and the cDNA sequence that encodes the protein (SEQ ID NO: 20). Applicants further argue that the specification further teaches the most members of the AtTLP family, including AtTLP9 (SEQ ID NO: 9), have a well conserved tubby domain at their C-terminus, a conserved F-box containing domain, and two TUB motifs

(TUB1 and TUB2). Applicants further argue that one skilled in the art would conclude that Applicants were in possession of the invention (response, page 14, lines 6-18).

Applicant's arguments were fully considered but were not found to be persuasive.

The Federal Circuit has recently clarified the application of the written description requirement. The court stated that a written description of an invention "requires a precise definition, such as by structure, formula, [or] chemical name, of the claimed subject matter sufficient to distinguish it from other materials." University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). The court also concluded that "naming a type of material generally known to exist, in the absence of knowledge as to what that material consists of, is not a description of that material." Id. Further, the court held that to adequately describe a claimed genus, Patent Owner must describe a representative number of the species of the claimed genus, and that one of skill in the art should be able to "visualize or recognize the identity of the members of the genus." Id.

Finally, the court held:

> A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus. Id.

See also MPEP Section 2163, page 174 of Chapter 2100 of the August 2005 version, column 1, bottom paragraph, where it is taught that

> [T]he claimed invention as a whole may not be adequately described where an invention is described solely in terms of a method of its making coupled with its function

and there is no described or art-recognized correlation or relationship between the structure of the invention and its function. A biomolecule sequence described only by a functional characteristic, without any known or disclosed correlation between that function and the structure of the sequence, normally is not a sufficient identifying characteristic for written description purposes, even when accompanied by a method of obtaining the claimed sequence.

See also Amgen Inc. v. Chugai Pharmaceutical Co. Ltd., 18 USPQ 2d 1016 at 1021, (Fed. Cir. 1991) where it is taught that a gene is not reduced to practice until the inventor can define it by "its physical or chemical properties" (e.g. a DNA sequence).

Examiner maintains that the specification does not have adequate written description for the genus of sequences which have at least 70% or 95% sequence identity to SEQ ID NO: 9, genus of sequences which hybridize to SEQ ID NO: 20 under current written description guidelines, and one skilled in the art cannot reliably predict the structures of these sequences based upon the disclosure of SEQ ID NO: 9 and 20. It is maintained that claims encompass a large number of undisclosed structures, and Applicant's have failed to correlate said undisclosed structures of their broadly claimed genus to the function increasing the sensitivity of a plant to an environmental factor. Applicants have failed to describe functional domains or elements that are shared by said undisclosed structures of their broadly claimed genus. It is further maintained that Applicants have failed to reduce their broadly claimed genus to practice. Accordingly, there is lack of adequate description to inform a skilled artisan that applicant was in possession of the claimed invention at the time of filing.

See in re Curtis (69 USPQ2d 1274 (Fed. Cir.2004), where the court held that there was sufficient evidence to indicate that one of ordinary skill in the art could not

predict the operability of other species other that the single one disclosed in the specification. The court held that a disclosure naming a single species can support a claim to a genus that includes that species if a person of ordinary skill in the art, reading the initial disclosure, would "instantly recall" additional species of the genus already "stored" in the minds, but if other members of the genus would not "naturally occur" to a person of ordinary skill upon reading the disclosure, then unpredictability in performance of species other than specifically enumerated defeats claims to the genus.

For at least these reasons and the reasons of record stated in the previous Office Action, the requirement for written description has not been met.

Claim Rejections - 35 USC § 102

5. Claims 6-9 and 30-33 remain rejected under 35 U.S.C. 102 (b) as being anticipated by Lin et al. (NCBI, GenBank, Sequence Accession No: AC011623, Pages 1-37, Published January 2001) for the reasons of record stated in the Office action mailed on July 28, 2006.

Applicants argue that Lin et al. does not teach cDNA sequence encoding a polypeptide which has 100% sequence identity to instant SEQ ID NO: 9. Applicants further argue that sequence taught in the reference is the genomic sequence interrupted by four introns, and thus sequence taught by Lin et al. does not anticipate the instant SEQ ID NO: 20 encoding SEQ ID NO: 9. Applicants further argue that the presence of introns in the nucleotide sequence taught in the reference would result in low homology to instant SEQ ID NO: 20. Applicants further argue that a skilled artisan would readily

recognize that it would not hybridize to SEQ ID NO: 20 under high stringency conditions, and thus nucleic acid sequence of claim 7 is not anticipated by the teachings of Lin et al. (response, page 7, lines 1-25).

Applicant's arguments were fully considered but were not found persusaive. Applicants are remined that Lin et al. clearly teaches a cDNA sequence which has 100% sequence identity to instant SEQ ID NO: 20, and encodes a polypeptide which has 100% sequence identity to the instant SEQ ID NO: 9. The reference clearly teaches said cDNA sequence under "mRNA". A copy of cDNA sequence taught by Lin et al. under accession number AC011623 is attached with this Office action. In view of this, Applicant's arguments are rendered moot.

Accordingly, the rejection is maintained.

Claim Rejections - 35 USC § 103

6. Claims 6-15 and 30-33 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (NCBI, GenBank, Sequence Accession No: AC011623, Pages 1-37, Published January 2001) and in view of Maniatis et al. (Cold Spring Harbor Laboratory, Chapter 12, Pages 404-421, New York, 1982) for the reasons of record stated in the Office actions mailed on July 28, 2006. Applicants traverse the rejection in the paper filed on December 4, 2006

Applicants argue that it would not be obvious to one skilled in the art to recognize all functional genes based on a genomic sequence containing genes. Applicants further argue that an artisan also would not readily recognize a cDNA sequence, which

corresponds to a functional gene, based on a genomic sequence. Applicants further argue that Maniatis does not teach or suggest the claimed nucleic acid, and thus combined teachings of two references does not render the claimed method obvious (response, page 8, last paragraph bridging pages 8 and 9).

Applicant's arguments were fully considered but were not persuasive. It is maintained that AC011623 does teach cDNA sequence which has 100% sequence identity to instant SEQ ID NO: 20 as discussed above (see 35 U.S.C. 102(b) rejection). It is important to note that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant case, It would have been obvious to one of ordinary skill in the art to use the method of Maniatis et al. in expressing the polypeptide taught by Lin et al. in *E. coli*, and isolating it. As discussed in previous Office actions, it is maintained that one of ordinary skill in the art would have been motivated to do so for the purpose of protein characterization.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In the instant case, one of ordinary skill in the art would have been motivated to characterize the polypeptide by expressing in a host cell.

Accordingly, claims 6-9 and 30-33 as a whole are prima facie obvious over the combined teachings of the prior art.

Conclusions

7. Claims 6-15 and newly added claims 26-33 are rejected. Claims 22-25 are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is set to expire within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date

of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinod Kumar whose telephone number is (571) 272-4445. The examiner can normally be reached on 8.30 a.m. to 5.00 pm.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PHUONG T. DU
PRIMARY EXAMINER

1/30/07